

Fiscal Rules and Creative Accounting in the EU:
An Inspection based on Stock-Flow-Adjustments

Abstract:

We analyze whether creative accounting in fiscal balances is a significant issue in EU countries. In order to do so, we regress stock-flow-adjustments, which serve as an indicator for false reporting of public debt and deficit numbers, on several measures of fiscal rules in a panel framework covering 27 EU countries in the time 1991-2012. While stock-flow-adjustments can principally occur accidentally resulting from idiosyncratic accounting errors a significant relation between mis-reporting, as measured by stock-flow-adjustments, and the existence and strength of fiscal rules, which reduce government's financial latitude, clearly indicates that governments apply creative accounting in a significant manner.

Key Words: European Monetary Union, Creative Accounting, Fiscal Rules, Stock-Flow-Adjustments

JEL: H 62, H61, F34, F36

1. Introduction

High fiscal deficits and the resulting huge indebtedness are important problems in many countries. A major policy response to tackle these problems is the implementation of fiscal rules. Important examples are the 1997 proposal for a balanced budget in the US, the so-called Maastricht criteria for deficit and debt contracted in the Stability and Growth Pact for the EMU, and recently the EMU's Fiscal Compact, where countries agreed to implement fiscal rules into national laws. Since fiscal rules restrict the financial latitude of governments they incentivize creative accounting, i.e. fiscal transaction that improve the officially reported debt and deficit numbers in order to circumvent restricting rules. This issue was analyzed *theoretically* in a pioneering paper by Milesi-Ferretti (2003), which was inspired by von Hagen and Hardens (1996) contribution. The empirical discussion on the effectiveness of fiscal rules started already in the early nineties (see, e.g. von Hagen, 1991). A number of interesting papers, as Dafflon and Rossi (1999), Koen and van den Noord (2005), and Milesi-Ferretti and Moriyama (2006) provide evidence on how public accounts have been polished in several EU countries in the run-up of the foundation of the EMU.

Inspired by this interesting literature our paper aims to analyze the issue of creative accounting further with a broader perspective. While the literature on creative accounting in the EMU is rather focused on a specific event – the formation of the EMU with its Stability and Growth pact – the question arises whether creative accounting was still a problem in the following years or whether it was rather restricted to the formation period of the EMU. In addition one may ask whether internal fiscal rules, imposed by the countries own initiative work more efficiently (meaning that they trigger no or less creative accounting) as externally imposed rules like the Maastricht criteria do.

In order to provide a general view we try to answer these questions by applying panel regressions for a large sample of 27 European countries for a broad time span (1991-2012).

We regress an indicator for wrong reporting of public debt and deficits, on several measures of fiscal rules. Of course measuring errors can occur accidentally. However, a significant relation between mis-reporting and fiscal rules, which reduce government's financial latitude, would indicate that governments apply creative accounting in a significant manner.

In applying this empirical approach, the problem arises of how creative accounting can be operationalized and detected if we do not ferret out specific cases but rather try to provide general analysis with macroeconomic numbers. Naturally, numbers on the amount of creative accounting are not reported in official accounts and mis-accounting can, as mentioned, result from errors and is not necessarily result of cheating. So, how can we operationalize it. Here we pick up a very interesting idea proposed by Von Hagen and Wolff (2006) in a seminal paper: They consider so-called stock-flow-adjustments in order to analyze creative accounting.

Stock-flow-adjustments occur if the current fiscal deficit is not equal to the difference between current debt and the debt of the previous period, whereas theoretically both quantities should be equal.¹ Certain transactions undertaken for creative accounting, i.e. to circumvent fiscal rules, lead to stock-flow-adjustments. Thus, stock-flow-adjustments can be used to detect creative accounting. In principle stock-flow-adjustments can occur without intended creative accounting and, thus, the existence of stock-flow-adjustments alone is no evidence for creative accounting. However, von Hagen and Wolff (2006) show based on regression models that stock-flow-adjustments are significantly related to fiscal rules. The significant relation between stock-flow-adjustments and fiscal rules provides evidence that governments use creative accounting, i.e. that certain measures to circumvent the rules are applied, which in turn leads to stock-flow-adjustments.

¹ Stock-flow-adjustments and their relation to fiscal rules are discussed in more detail in the next section.

Our paper is based on this interesting idea and analyzes the issue of creative accounting and stock-flow-adjustments induced by fiscal rules further. We expand and complement the literature in several ways. First, we generalize the analysis by considering the influence of several fiscal rule indices reflecting the existence and strength of national – internal – fiscal rules, while von Hagen and Wolff (2006) and the other empirical papers discussed above are focused on a specific issue, the introduction of the Euro and the corresponding rules (Maastricht criteria) that countries had to stick to in order to become member of the EMU. Thus, they consider a different case of a fiscal rules; rules which are externally imposed and not result of the internal political process.

The influence of internally imposed rules is an important issue, e.g. since a basic tool to solve the European Debt Crisis and to ensure financial stability in the future is the Fiscal Compact, which implies the implementation of fiscal rules into national law by the member states while Stability and Growth Pact in a certain sense was weaker since it only implies the commitment to stick to external rules. Also the effectiveness of the fiscal compact may be weakened by creative accounting. To outguess the functioning of the Fiscal Compact it is interesting to know whether fiscal rules included in national law also lead to creative accounting or whether this was only the case for externally imposed rules that follow from the Stability and Growth Pact and the desire to become member of the EMU. Of course one could argue that the rules introduced because of the Fiscal Compact are in a certain sense externally imposed, too, since there was external pressure. In fact, these laws are a hybrid between external and internal rules. If we find that the internal rules do not lead to creative accounting we, thus, can still not be sure that the same holds true for the Fiscal Compact rules. If we find, however, that also internal rules induce creative accounting the effectiveness of the fiscal compact is also and all the more questionable.

We further contribute to the literature by distinguishing between fiscal rules that aim on the countries' deficit and rules related to the debt situation. This issue is analyzed in detail

by considering specific indices for both types of fiscal rules. This complements the literature since it enables us to analyze whether there are differences in the impact of different types of restrictions on creative accounting.

A third major contribution to the literature is that we provide a broader view on the impact of the rules resulting from EMU membership for an expanded time span. While the literature highlighted above is focused on the inception of the EMU, we analyze the issue in a long-term perspective, making use of the advantage that we can include longer time series and more recent data than older papers. It is especially important to see whether creative accounting was an issue during the foundation years of the EMU or whether it was still an issue in later years.

Our research is related to another strand of the literature, which analyzes the very important question of whether fiscal rules effectively influence the budget process. A recent overview on this comprehensive literature can be found, e.g., in Maltritz and Wüste (2015). They also analyze the joint influence of fiscal rules and stock-flow-adjustments on the budget process. While they focus on the influence of both variables, SFA and fiscal rules, on the budget process, we complement the literature by analyzing how stock-flow-adjustments are influenced by fiscal rules to analyze the question of whether creative accounting takes place.

Our empirical analysis based on panel regressions with annual data for 27 EU countries in the time 1991 to 2012 confirms the results of the literature: we find a significant relation between EMU membership (with the implied rules) and stock-flow-adjustments, which indicates that creative accounting is triggered by EMU membership. We complement the literature by detecting that this is also an issue in recent years and not only restricted to the formation of the EMU and its early years. However, creative accounting results not only from external rules and cheating on the EMU and fellow EU countries. Also internal rules lead significantly to stock-flow-adjustments no matter whether we consider rules related to debt or to deficit. This result prevails for several sub-periods.

The remainder is structured as follows. The concept of stock-flow adjustments and the relation to fiscal rules and creative accounting is explained in more detail in the next section, while Section 3 describes the research strategy and the data in more detail. Section 4 provides the results and Section 5 concludes.

2. Conceptual Considerations on Stock-Flow-Adjustments and Creative Accounting

2.1 What are stock-flow-adjustments and why do they occur?

To explain stock-flow-adjustments (SFA), which are sometimes also called debt-deficit-adjustments, we start with the basic relation for public finance:

$$D_t = B_t - B_{t-1} \quad \rightarrow \quad 0 = B_t - B_{t-1} - D_t \quad (1)$$

It says that the budget deficit, D_t , equals the change of the debt, i.e. the difference between the debt level in year t , B_t , and the year before, B_{t-1} . However, in practice often differences are to observe. These residuals are the stock-flow-adjustments, SFA:

$$SFA_t = B_t - B_{t-1} - D_t \quad (2)$$

SFA result for a variety of reasons: “primarily from financial operations, for example, debt issuance policy to manage public debt, privatisation receipts, impact of exchange rate changes on foreign denominated debt. In general these should tend to cancel out over time” (European Commission 2003, 82). For a more detailed description of measures that lead to SFA, we refer to the literature, where this is already explained in detail with interesting examples (see, e.g. Dafflon and Rossi (1999) as well as in Koen and van den Nord (2005)). In the following, we

just explain the basic ideas and give some examples in order to convey the reader a feeling about the issue.

Stock-flow-adjustments may result from differences in the accounting scheme; while debt is measured in cash numbers the budget balance is on accrual basis. SFA occur because of recorded revenues (or expenditures) that impact the deficit, for which, however, no cash payment is made. The collecting of outstanding revenues or taxes, e.g., leads to negative stock-flow-adjustments in the respective period since the debt is reduced by the payments while the deficit is unchanged (since revenues and taxes accrued in periods before). If, by contrast, interest payments on bonds accrue in a certain period but are not paid, e.g. because it is a zero-coupon-bond, it increases the deficit but does not impact the debt. Thus, we observe a difference between debt change and deficit, i.e. also negative stock-flow-adjustments. Similarly, arrears in payments that the government is required to make lead to negative stock-flow-adjustments because accruing payments are not made in cash, which increases the deficit but does not change the debt. Tax and other revenue arrears, by contrast, lead to positive stock-flow-adjustments since taxes accrue, which reduces the deficit, but no payment is made and, hence, the debt remains unchanged.

SFA result also from valuation and classification effects, e.g. because of exchange rate changes: If debt is issued in foreign currency a devaluation of the domestic currency leads to an increase in the outstanding debt (converted into domestic currency) while the deficit is unchanged from this transaction. An important cause for SFA is the selling of public capital, e.g. the privatization of public enterprises, or reverse the expenditures for increasing the public capital stock, e.g. the acquisition of private enterprises by the public sector. Similar to the selling or buying of assets also the re-classification of public enterprises as private corporations (or vice versa) may lead to stock-flow-adjustments, since it changes the debt but not the deficit – at least not directly or not in the same amount.

2.2 Creative accounting and the impact of fiscal rules on stock-flow-adjustments

If a government is confronted with fiscal rules it has incentives to increase its fiscal latitude by creative accounting (as it was theoretically proofed by Milesi-Ferreti, 2003). With creative accounting we mean that certain fiscal transactions are applied to polish debt or deficit numbers while the net worth of the fiscal position is not improved. From such transactions made to avoid the breaking of fiscal rules may stock-flow-adjustments result. It is important to note that depending on the government's aim an impact in different directions on SFA can result. When the government undertakes actions in order to avoid breaking debt rules, i.e. fiscal rules related to debt figures, it decreases stock-flow-adjustments (if the action has no influence on the deficit). This can be seen in Equation (2): Reducing the current debt without changing the deficit leads to reduced SFA. Conversely, an action undertaken to reduce the deficit (that does not impact the debt) increases SFA since the deficit has a negative sign in Equation (2).

We would like to emphasize that not all types of fiscal gimmicks and creative accounting necessarily lead to stock-flow-adjustments. Several transactions may change both the deficit and the debt situation and, thus, no stock-flow-adjustment is to observe. Vice versa not all transactions that lead to stock-flow-adjustments result from intended creative accounting. On the contrary, as mentioned above, e.g. in the statement of the European commission, stock flow adjustments were originally considered to be residuals resulting from occasional actions that should cancel out in the course of time.

A basic issue in our paper (as in several above cited papers) is to detect whether (or to which extent) observed stock-flow adjustments are random residuals or whether they indicate creative accounting. One approach could be a case-study-type analysis of observed transactions that were suspicious for creative accounting. As discussed in the introduction some interesting papers provide such interesting anecdotic evidence on the issue. Dafflon and Rossi (1999), e.g., give an interesting overview about important fiscal gimmicks applied by

several European countries in the run-up to the currency union. This evidence suggests that at least in some cases important transactions that lead to SFA were intended creative accounting to circumvent binding fiscal rules.

A more general approach analyzes the relation between stock-flow-adjustments, creative accounting and fiscal rules by applying regression models (see, e.g., von Hagen and Wolff, 2006). It relies on macroeconomic numbers of SFA, debt and deficit in order to analyze whether and to which extent SFA are driven by creative accounting. The basic idea follows from theoretical findings of political economy models (see e.g. Milesi-Ferretti, 2003): If fiscal rules restrict government actions they have incentives to circumvent these rules by creative accounting, which may lead to stock-flow-adjustment. Thus, stock-flow-adjustments should depend significantly on fiscal rules if they result from creative accounting. If a significant relation can be detected empirically, it provides evidence that stock-flow-adjustment are caused by creative accounting, i.e. from measures applied to circumvent fiscal rules.

2.3 Different types of rules: Internal versus external and debt versus deficit

We complement this interesting literature in several ways in order to compile a comprehensive analysis that provides additional information for several dimensions of the problem. All of the papers mentioned so far focus on rules related to the EMU, i.e. rules that were externally imposed to the country by agreeing on international contracts. We consider additionally other – internal – fiscal rules. In fact, several EU countries imposed certain types of fiscal rules by their own decision. This may result from mutual agreement in the society recognizing that governments tend to myopic behavior and high deficit spending in order to maximize chances of re-election, which is not beneficial for the country in the long-term. In fact, in Milesi-Ferretti (2003) creative accounting is not restricted to external fiscal rules but can be applied for internal fiscal rules, too.

One could suppose that (societies within) countries are rather willing to cheat to circumvent rules that are so to say imposed externally (as to benefit from EMU membership and free-ride on other countries thriftiness) while they rather stick to their own rules. This may be since governments are stronger punished, e.g. by their potential voters, if (it is detected that) they circumvent national rules than for cheating on their fellow EMU members. What is more, national rules are often fixed in national laws, while the enforcement mechanism of the Stability and Growth Pact was rather weak.

The data available enables us to distinguish between debt and deficit rules. This in turn eases the above discussed problem that rules can either lead to positive or negative stock-flow-adjustments depending on whether they concern the debt or the deficit. The data used in our analysis are discussed in more detail in the next section.

3. Research Approach and Data

We aim to analyze empirically whether there is a significant relation between SFA and certain types of fiscal rules. We do so by running regressions with panel data where the dependent variable is a measure for SFA which is regressed on indicators for fiscal rules and a bunch of control variables. Our sample covers 27 EU countries in the period 1991-2012 as well as sub-periods of this time span. The observation period stops in 2012 for conceptionell and practical reasons. In 2012 the fiscal compact was introduced, i.e. European governments ratified national laws that included the agreed fiscal rules. This blurred the boundaries between internal and external rules: While so far the rules which our index referred to were primarily internal rules, these rules can be now result of external influence from the EMU. Additionally, data on the variables related to our main interest, the indicators for fiscal rules, are available in the time of writing (2015) not longer than until 2012.

We use data from several sources. A detailed description of data and data sources can be found in Table A-1 in the appendix. Regarding our dependent variable, the stock-flow-adjustments, we follow the literature (see, e.g. von Hagen and Wolff, 2006) and use an indicator calculated from data provided in the AMECO database. These time series are based on Eurostat data, which relies on the ESA 95 accounting standard. SFA are calculated as shown in Equation (2) as the difference of general government consolidated gross debt from year t and $t-1$ plus the general government budget balance (respectively minus the deficit). This number is standardized by the country's overall expenditures.

Our fiscal rules indicators rely on data provided by the European commission. For the abovementioned reasons, we distinguish between deficit rules, on the one hand, and debt rules, on the other. These indices are calculated with a balanced score card based on several criteria that measure the existence and strength of fiscal rules approximated by several features, e.g., whether the rule is written down in the constitution or in an ordinary law, how (easy) objectives can be changed, the enforcement mechanism, how visible are the rules in the media. A detailed description can be found in Table A-2 in the appendix.

Besides the fiscal rules indices discussed so far we include a dummy for EMU membership. In doing so, we follow the literature on creative accounting. It aims to detect whether membership in the EMU tends to increase stock-flow-adjustments and creative accounting. In particular it serves as an indicator for fiscal rules resulting from this membership, the so-called Maastricht criteria written-down in the Stability and Growth Pact.

In addition to the discussed measures for fiscal rules we include a bunch of control variables. An important control variable is a fiscal council index. Fiscal councils operate in several European with different rigor. Fiscal councils often constrain government's range for deficit spending in one way or another. Similar to fiscal rules they may, thus, lead to creative accounting. Fiscal councils may, by contrast, also reduce the incentive for creative accounting

since the existence of fiscal councils increases the probability that creative accounting is detected. In any case it seems appropriate to account for the existence and strength of fiscal councils in our analysis. We apply a fiscal council index along three dimensions. It covers the scope, the independence, and the influence of a fiscal council.

Governments in democratic countries are supposed to have the highest incentives to please the electorate in election years, at least if one assumes some kind of short-term memory of the electorate. This is a general finding of the political business cycle theory. If governments are constrained in their spending abilities, e.g., by fiscal rules, they have higher incentives for creative accounting in election years. In order to account for this issue, we include an election dummy that reflects whether the country faced an election of (central) governmental institutions in a given year.

Furthermore, we apply a federalism dummy that accounts for the structural organization of the state, which means whether it is a federal country or centralized country. This makes a difference and may influence the occurrence of SFA and creative accounting for several reasons. Local governments may, e.g., reduce the incentive for creative accounting since they may keep an eye on the central government (especially if they have different political orientation). This works in particular if local governments look through fiscal gimmickry and have power and will to prevent it. However, also local governments have incentives for creative accounting. In addition, they constrain the fiscal latitude of the central government, which may increase their incentive for creative accounting.

We also include the political orientation of the government. To do so, we use the ratio of left-wing members of the parliament to total seats. Traditionally left-wing parties were assumed to be more in favor for public deficit spending than other parties. Thus, they may have higher incentives for creative accounting if their financial latitude is restricted. However, also right-wing parties may produce higher deficits, especially by cutting taxes, which reduces

the government's income. Thus, it is also thinkable that right-wing parties may have higher incentives for creative accounting. In any case, one should control for this issue.

In addition to these socio-political control variables we include some economic variables, which account for changes in economic activity and spending, in particular GDP growth and the unemployment rate. Clearly, the economic situation influences the fiscal situation – on the one hand, because of changing tax revenues, on the other, because of changing spending needs, e.g. for unemployment assistance. Thus, it may change the incentives for creative accounting.

Some of our variables have little or no variation over time. This holds especially true for our primary concern, the fiscal rule indices and the Euro dummy, but also for other variables, as the federalism dummy. Thus, it does not make sense, yet it is even not possible, to include country fixed effects. However, we exploit the panel structure of the data further by including time effects. We test for unit root with the Philips-Perron Chi-square test. It shows that our explaining variables (except the EMU dummy) are not afflicted by (un-) stationarity issues. Our data set is, however, afflicted by heteroscedasticity issues, as the Breusch-Pagan-Godfrey test shows. Thus, we apply a regression with GLS (period) weights and White correction.

4. Results

4.1 EMU membership

The results of our basic estimation are presented in Table 1. These results are derived with the estimation approach and the variables described in the last section. We start our discussion with the results for the impact of EMU membership on stock-flow-adjustments, which relates

our research to the empirical literature on creative accounting since the main focus of this literature is the impact of fiscal rules corresponding with EMU membership.

It can be seen that the EMU dummy is significant with a positive sign. This means that EMU membership with the implied rules (e.g. Maastricht criteria) leads significantly to stock-flow-adjustments. This is strong evidence for creative accounting. It confirms results of the literature where a significant influence is detected and EMU membership respectively problems with the Maastricht criteria lead to positive stock-flow adjustments.

The Maastricht criteria include a deficit (no more than 3% of GDP) as well as a debt rule (no more than 60% of GDP). In Section 2.2 we discussed in detail that fiscal rules can lead either to positive SFA (in case the deficit figures are polished) or to negative SFA (in case the debt figures are tuned). From the positive sign of the EMU dummy we can conclude that for EMU membership and the following Maastricht criteria rather the deficit criterion was problematic and circumvented by creative accounting. This result is in line with the findings of the literature.

Our results complement the related literature by providing insights in timeline of creative accounting resulting from EMU membership. The discussion of creative accounting in most of the papers overviewed in the introduction is primarily focused on creative accounting applied to become EMU member, i.e. the period when countries for participating in the EMU have been selected. This means creative accounting would principally occur in the reference year (1997) or the years shortly before or thereafter and effects would be related to these years. Our dummy covers all years of membership.² Our period fixed effects approach controls in addition for unobserved influences of specific periods (as e.g. the year 1997). Thus, the significance of the EMU dummy implies that creative accounting was

² The applied EMU dummy describes whether a country was EMU member in a specific period or not. This means in addition to the distinction between members and non-members it distinguishes for EMU members between years of membership and non-membership years.

applied not only in the run-up to the EMU but also later on. The results suggest that EMU membership (and not only the attempt to join the EMU) stimulates creative accounting since the significant dummy indicates that EMU countries have significantly more stock-flow-adjustments than non-members or than the member countries had before they joined the EMU.

These above discussed conclusions are further confirmed by the estimation results provided in Table A-3, which are obtained by restricting the panel for the period 1998-2012, i.e. the period when the EMU was in place. Also in this period the EMU dummy is (positively) significant. The same holds true for the period 2002 to 2012 (see Table A-4), i.e. the period when the Euro was introduced as means of payment and the EMU was consolidated. These results mean the EMU effect results not (only) from the introduction period; also in later years EMU membership fosters stock-flow-adjustments and creative accounting.

4.2 Fiscal rule indices

Now we turn our attention to the influence of several fiscal rule indices on stock-flow-adjustments. As explained in the last section these indices cover the existence and strength of fiscal rules, which have been introduced by the countries' own initiative, potentially based on the insight that myopic governments have short-term incentives to run higher deficits than it is optimal in the long run.

As already discussed in Section 2.2 fiscal rules may lead either to positive or to negative SFA depending on whether deficit or debt limits shall be circumvented. If creative accounting is applied to deal with both the deficit as well as the debt limit it may lead to contradicting influences in both directions, which may render the influence of the fiscal rule index insignificant.

In order to account for this issue we include, on the one hand, a fiscal rule index that covers rules related to debt only and, on the other, a fiscal rule index that covers exclusively deficit rules. For the debt index we expect a negative sign since a reduction of debt, which is not covered by changes in the deficit, leads to negative SFA (see Equation 2). Vice versa the deficit rule index is supposed to lead to reduced deficits which increases SFA (since the deficit has a negative sign, see Equation 2).

It can be seen in Table 2 that both fiscal rules indices have significant impact on stock-flow-adjustments with the expected sign. This indicates that governments apply creative accounting. Depending on the type of rule these are either positive (for deficit rules) or negative (for debt rules). Thus, SFA result not from idiosyncratic accounting errors, but are significantly related to fiscal rules that constrain government's financial latitude. This is strong evidence that creative accounting takes place to circumvent internal fiscal rules.

Also for (internal) fiscal rule indices we run estimations for different time spans in order to provide additional evidence; especially we analyze whether the influences do change over time and also to check the robustness of the results. As above we consider the period starting in 1998, i.e. starting with the formation of the EMU, and the period starting in 2002, i.e. the time when the Euro was introduced as official currency and the EMU was settled. The results are provided in Table A-5 and A-4 in the appendix. In both sub-periods the results are similar: internal fiscal rules are significantly related to SFA. Altogether the results show that the significant relation between fiscal rule indices and stock-flow-adjustment is very stable and robust.

4.3 Comments on the control variables

We want to add some notes on the results for the control variables. Some of the variables are significant in a least in some specifications. This concerns, for example, GDP-growth, federalism dummy, the election dummy, and the political orientation of the government. This means it makes sense to include these variables in order to obtain unbiased results. The lacking or limited significance can result from several reasons. Of course it is possible that there is simply no influence or the impact is at least not strong enough to be detected. It is also possible, however, that the lacking significance results since opposing directions of influence outbalance each other. Even in cases where the results are not significant influences may exist that are not detected since they impact SFA in both directions. A fiscal council, e.g., can put pressure on the government to fulfill both debt rules as well as deficit rules. Thus, creative accounting is supposed to be applied to deal with both issues, which impacts the stock-flow-adjustments in both directions, and overall reduces the amount of SFA. For this reason one should include the control variables even if they lack significance. For the same reason the lacking significance does not necessarily mean that the control variables do not influence stock-flow-adjustments.

5. Conclusion

Fiscal rules that constrain government's financial latitude impose incentives for creative accounting, which has been proofed theoretically by Milesi-Ferretti (2003). Several empirical papers provide evidence for creative accounting that occurred in particular when the EMU member countries have been selected, which required to fulfill the Maastricht criteria, a special case of fiscal rules. Since fiscal rules are an important policy tool the question about the importance of creative accounting, which hampers the effectiveness of rules, arises. Is it

just a minor problem related to a few cases that happened when the EMU was founded or an important persistent problem that hampers EU policy permanently?

Since creative accounting is, of course, not officially reported other approaches need to be applied. An interesting idea to analyze this issue in a broad perspective by using macroeconomic numbers is the analysis of stock-flow-adjustments, which has been suggested by von Hagen and Wolff (2006). Many creative accounting transactions lead to stock-flow-adjustments, i.e. deviations between the current deficit and the change in the debt stock. If fiscal rules lead to stock-flow-adjustments, i.e. a significant relation between fiscal rules and stock-flow-adjustments is detected empirically, it provides evidence that creative accounting is applied.

Based on this idea we analyze the relationship between stock-flow-adjustments and fiscal rules with panel data for 27 EU countries in the period 1991 to 2012. The literature is focused on fiscal rules resulting from the stability and growth pact and, in particular, the period when the EMU was formed. In line with the literature we consider the influence of EMU membership, where we contribute by providing additional information resulting from longer time spans and more recent data. We complement and enhance the literature by following a broader approach that provides additional evidence on the issue. In contrast to the rather externally imposed rules following from EMU membership our main focus is on internal fiscal rules introduced by countries own initiative. One can presume that governments may regard internal rules differently than external rules as the Maastricht criteria. We measure the existence and strength of fiscal rules by applying several fiscal rule indices. In particular we distinguish between rules that constrain the amount of debt and deficit rules. We aim to provide robust results by analyzing different time spans. We also include several socio-political control variables, as fiscal council indices, election dummies and the state structure, together with economic variables, as GDP growth and the unemployment rate.

Our basic result is that several types of fiscal rules are significantly related to stock-flow-adjustments. Thus, stock-flow-adjustments result not only from idiosyncratic accounting errors, but are significantly related to fiscal rules that restrict government's financial freedom. This provides significant evidence for creative accounting by European governments. We confirm the results of the literature in that EMU membership and the implied rules have significant impact on stock-flow adjustments. We enhance the literature by showing that creative accounting because of EMU membership is not only in issue in the formation of the EMU or its early years. Yet, creative accounting is detected also for the years after 2002.

We further show that also internal rules that countries introduced by their own initiative are significantly related to stock-flow-adjustments. This finding is confirmed for several sub-periods, which shows that this finding is very stable and robust. It implies that also internal rules imposed by countries own initiative and not only externally imposed rules lead to creative accounting.

National rules are often articulated in national laws or even in the constitution. Even this seems not to prevent creative accounting. These are rather bad news with respect of the effectiveness of the Fiscal Compact, one of the EMU's basic tool to fight the crisis and prevent similar problems in the future, which is in its core the agreement to articulate fiscal rules in national laws. Thus, it is some kind of hybrid between the internal and external rules discussed above. Since both types of rules are broken permanently the effectiveness of the fiscal compact may be doubted.

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Tables

Table 1: Basic Estimation with EMU Membership as Indicator for Fiscal Rules

Dependent Variable: Stock-Flow-Adjustments

Sample: 1991 - 2012

Periods included: 22

Cross-sections included: 27

Total panel (unbalanced) observations: 438

Variable	Coefficient	Std. Error	t-Statistic	p-Value
C	0.380452	0.799294	0.475985	0.6343
GDP	0.248697	0.156042	1.593781	0.1118
UNEMPLOYMENT	0.016165	0.021556	0.749906	0.4537
ELECTION-DUMMY	0.233936	0.692209	0.337955	0.7356
FEDERAL-DUMMY	-1.143261	0.882304	-1.295768	0.1958
POL. ORIENTATION	-0.013033	0.007556	-1.724924	0.0853
FISCAL COUNCIL	0.021009	0.159195	0.131973	0.8951
EURO	2.386428	0.742806	3.212719	0.0014
R-squared	0.145235	F-statistic		2.481939
Adjusted R-squared	0.086718	Prob(F-statistic)		0.000062

Table 2: Estimation with (Internal) Fiscal Rule Indicators: FRI-Budget and FRI-Debt

Dependent Variable: Stock-Flow-Adjustments

Sample: 1991 - 2012

Periods included: 22

Cross-sections included: 27

Total panel (unbalanced) observations: 438

Variable	Coefficient	Std. Error	t-Statistic	p-Value
C	1.454440	0.666546	2.182055	0.0297
GDP	0.218062	0.154566	1.410800	0.1591
UNEMPLOYMENT	0.006719	0.021224	0.316577	0.7517
ELECTION-DUMMY	0.171306	0.659159	0.259885	0.7951
FEDERAL-DUMMY	-0.963785	0.816302	-1.180672	0.2384
POL. ORIENTATION	-0.013086	0.007232	-1.809331	0.0711
FISCAL COUNCIL	-0.236780	0.160490	-1.475356	0.1409
FRI-BUDGET	0.485470	0.132116	3.674575	0.0003
FRI-DEBT	-0.317350	0.162496	-1.952971	0.0515
R-squared	0.172781	F-statistic		2.938590
Adjusted R-squared	0.113984	Prob(F-statistic)		0.000001

Appendix

Table A-1: Description of Variables

Variable	Definition	Source
SFA: Stock-flow adjustments	Stock-flow adjustments are calculated as the sum of the general government budget balance and the difference of general government consolidated gross debt from year t and t-1 in percent of total general government expenditures. (see Equation 2)	AMECO; own calculations
GDP: Real GDP growth	Change of real GDP in percent	IMF Economic Outlook Database
Unemployment: Change in unemployment rate	$\frac{u_{i,t} - u_{i,t-1}}{u_{i,t-1}} \times 100$ <p>where $u_{i,t}$ is the unemployment rate in country i at time t</p>	AMECO; own calculations
Election-Dummy	Dummy variable which takes the value 1 if there was a legislative or executive election in a given country in a given year and 0 if otherwise	Beck et al. (2001); own calculations
Federalism	Federalism; coded: 0 = no; 1 = yes.	Armingeon et al. (2010); own calculations
Pol	Political Orientation of the government: Percentage share of government posts that were held by social democratic or other left parties whereby the percentaged share is weighted by the number of days the government was in office in a given year	Armingeon et al. (2010); own calculations
FCI: Fiscal Council Index	Each fiscal council is scored as 1 respectively if it (1) provides analysis on fiscal policy developments without normative judgement, (2) provides independent macroeconomic and/or budgetary forecasts, (3) issues normative statements (involving judgement) on fiscal policy, or (4) issues recommendations (considering policy alternatives) in the area of fiscal policy. If one country posses more than one council in a given year, the councils are added, whereby the highest ranked council is weighted with 1, the second highest with 1/2 , the third highest with 1/3 etc. Construction based on European Commission (2011, 117).	EU Fiscal Institutions Database ³ ; own calculations
Euro	Dummy variable which takes the value 1 if a country was a member of the Eurozone in a given year and 0 if otherwise	European Central Bank ⁴
Fiscal Rule Indices: FRI-Budget/FRI-Debt	See Table A-2	EU Fiscal Rules Database ⁵ ; own calculations

³ http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/independent_institutions/index_en.htm

⁴ <http://www.ecb.int/euro/intro/html/map.en.html>

⁵ http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/fiscal_rules/index_en.htm

Table A-2: Construction of the Fiscal Rule Indices

The fiscal rule indices FRI-Budget and FRI-Debt are constructed using the following steps: First we consider whether fiscal rules are in place in a specific country in the considered year. Second, we distinguish whether a rule aims on the fiscal budget balance or the debt. Third the strength of the rules is evaluated using the following scheme.

Criterion 1: Statutory base of the rule

- 4 Constitutional base
- 3 The rule is based on a legal act (e.g. Public Finance Act, Fiscal Responsibility Law)
- 2 The rule is based on a coalition agreement or an amendment reached by different general government tiers (and not enshrined in a legal act)
- 1 Political commitment by a given authority

Criterion 2: Room for setting and revising objectives

- 3 There is no margin for adjusting objectives (they are encapsulated in the document underpinning the rule)
- 2 There is some but constrained margin in setting or adjusting objectives
- 1 There is complete freedom in setting or adjusting objectives (the statutory base of the rule merely contains broad principles or the obligation for the government or the relevant authority to set targets)

Criterion 3: Nature of body in charge of monitoring respect and enforcement of the rule

The score of this criterion index is constructed as a simple average of the two elements below:

Nature of the body in charge of monitoring respect of the rule

- 3 Monitoring by an independent authority (Fiscal Council, Court of Auditors or any other Court) or the national parliament
- 2 Monitoring by the ministry of finance or any other government body
- 1 No regular public monitoring of the rule (there is no report systematically assessing compliance)

The score of this sub-criterion is augmented by 1 if there is real time monitoring of compliance with the rule, i.e. if alert mechanisms of risk of non-respect exist.

Nature of the body in charge of enforcement of the rule

- 3 Enforcement by an independent authority (Fiscal Council or any Court) or the national parliament
- 2 Enforcement by the ministry of finance or any other government body
- 1 No specific body in charge of enforcement

Criterion 4: Enforcement of mechanisms of the rule

- 4 There are automatic correction and sanction mechanisms in case of non-compliance
- 3 There is an automatic correction mechanism in case of non-compliance and the possibility of imposing sanctions
- 2 the authority responsible is obliged to take corrective measures in case of non-compliance or is obliged to present corrective proposals to Parliament or the relevant authority
- 1 There is no ex-ante defined actions in case of non-compliance

The score of this variable is augmented by 1 if escape clauses are foreseen and clearly specified.

Criterion 5: Media visibility of the rule

- 3 Observance of the rule is closely monitored by the media; non-compliance is likely to trigger public debate
- 2 High media interest in rule compliance, but non-compliance is unlikely to invoke public debate
- 1 No or modest interest of the media

Table A-3:
Estimation Results for EMU Membership as Indicator for Fiscal Rules (1998-2012)

Dependent Variable: Stock-Flow-Adjustments

Sample: 1998 - 2012

Periods included: 15

Cross-sections included: 27

Total panel (unbalanced) observations: 359

Variable	Coefficient	Std. Error	t-Statistic	p-Value
C	0.059471	1.018242	0.058406	0.9535
GDP	0.285550	0.164984	1.730773	0.0844
UNEMPLOYMENT	0.016186	0.022467	0.720420	0.4718
ELECTION-DUMMY	-0.313909	0.732606	-0.428483	0.6686
FEDERAL-DUMMY	-1.920977	1.000892	-1.919265	0.0558
POL. ORIENTATION	-0.008598	0.008686	-0.989963	0.3229
FISCAL COUNCIL	0.133181	0.200816	0.663202	0.5077
EURO	2.465414	0.748503	3.293793	0.0011
R-squared	0.119030	F-statistic		2.168237
Adjusted R-squared	0.064133	Prob(F-statistic)		0.002414

Table A-4:
Estimation Results for EMU Membership as Indicator for Fiscal Rules (2002-2012)

Dependent Variable: Stock-Flow-Adjustments

Sample: 2002 - 2012

Periods included: 11

Cross-sections included: 27

Total panel (unbalanced) observations: 287

Variable	Coefficient	Std. Error	t-Statistic	p-Value
C	-0.995770	1.103659	-0.902244	0.3677
GDP	0.312419	0.181676	1.719649	0.0866
UNEMPLOYMENT	0.024044	0.022616	1.063158	0.2887
ELECTION-DUMMY	-0.508671	0.838878	-0.606371	0.5448
FEDERAL-DUMMY	-2.971474	1.177437	-2.523680	0.0122
POL. ORIENTATION	-0.000820	0.010009	-0.081939	0.9348
FISCAL COUNCIL	0.307559	0.225104	1.366296	0.1730
EURO	2.839064	0.808249	3.512611	0.0005
R-squared	0.106090	F-statistic		1.877954
Adjusted R-squared	0.049598	Prob(F-statistic)		0.019990

Table A-5:
Estimation with (Internal) Fiscal Rule Indicators: FRI-Budget and FRI-Debt
(1998-2012)

Dependent Variable: Stock-Flow-Adjustments
Sample: 1998 - 2012
Periods included: 15
Cross-sections included: 27
Total panel (unbalanced) observations: 359

Variable	Coefficient	Std. Error	t-Statistic	p-Value
C	1.642303	0.924526	1.776373	0.0766
GDP	0.243312	0.164714	1.477177	0.1406
UNEMPLOYMENT	0.004027	0.022124	0.182044	0.8557
ELECTION-DUMMY	-0.387588	0.696487	-0.556490	0.5782
FEDERAL-DUMMY	-1.524372	0.904738	-1.684877	0.0929
POL. ORIENTATION	-0.008601	0.008665	-0.992596	0.3216
FISCAL COUNCIL	-0.153391	0.227050	-0.675579	0.4998
FRI-BUDGET	0.437586	0.140507	3.114344	0.0020
FRI-DEBT	-0.356160	0.165695	-2.149487	0.0323
R-squared	0.126740	F-statistic		2.216595
Adjusted R-squared	0.069562	Prob(F-statistic)		0.001527

Table A-6:
Estimation with (Internal) Fiscal Rule Indicators: FRI-Budget and FRI-Debt
(2002-2012)

Dependent Variable: Stock-Flow-Adjustments
Sample: 2002 - 2012
Periods included: 11
Cross-sections included: 27
Total panel (unbalanced) observations: 287

Variable	Coefficient	Std. Error	t-Statistic	p-Value
C	0.792106	1.021149	0.775701	0.4386
GDP	0.252196	0.177984	1.416960	0.1577
UNEMPLOYMENT	0.014102	0.022649	0.622648	0.5340
ELECTION-DUMMY	-0.457334	0.783533	-0.583681	0.5599
FEDERAL-DUMMY	-2.456215	1.027002	-2.391635	0.0175
POL. ORIENTATION	0.001046	0.010083	0.103692	0.9175
FISCAL COUNCIL	-0.065497	0.252319	-0.259582	0.7954
FRI-BUDGET	0.551800	0.152152	3.626637	0.0003
FRI-DEBT	-0.395116	0.177989	-2.219887	0.0273
R-squared	0.120427	F-statistic		2.038523
Adjusted R-squared	0.061352	Prob(F-statistic)		0.008417